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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/783,008	02/15/2001	Gary A. Gibson	10003492-1	1270

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EXAMINER	
CHU, KIM KWOK	

ART UNIT	PAPER NUMBER
2653	6

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/783,008	GIBSON, GARY A.	
	Examiner	Art Unit	
	Kim-Kwok CHU	2653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment filed on 1/7/04 (paper 5)*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-17 and 19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-17 and 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Response to Remarks

1. Applicant's Remarks filed on January 7, 2004 have been fully considered but they are not persuasive.

(a) referring to claim 9, Applicant states that the prior art of Manalis teaches employment of "a thin layer of fluid" which is clearly different from Applicant's "molecules that are at least partially immersed in a fluid medium" (page 8 of the Remarks, last paragraph). Referring to the claimed feature "fluid medium", Applicant agrees that the prior art of Manalis discloses "a tip contacts a thin layer of fluid absorbed in a substrate" (page 8 of the Remarks, lines 5 and 6). Accordingly, in Fig. 2, Manalis teaches that the tip 115 is in a contact mode with the substrate S and a thin layer of fluid absorbed on there as it is scanned over the surface (column 2, lines 40-43). Since Manalis's thin layer of fluid contains molecules and these molecules are immersed in a fluid medium/layer, Manalis teaches Applicant's above claimed feature.

(b) other claims having a feature of ferrofluid is rejected by a newly found art of Hillner.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> *A person shall be entitled to a patent unless --*
> *(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.*

3. Claims 9, 10, 12 and 14 are rejected under 35 U.S.C. § 102(e) as being anticipated by Manalis et al. (U.S. Patent 6,519,221).

Manalis teaches an optical disk having all of the elements and means as recited in claims 9, 10 and 14. For example, Manalis teaches the following:

(a) as in claim 9, a data-storage device (Fig. 1);

(b) as in claim 9, a storage medium S (Fig. 1);

(c) as in claim 9, nanometer-scaled data storage areas in the storage medium (Fig. 1; column 1, lines 66 and 67; column 3, lines 38 and 39);

(d) as in claim 9, an energy-emitting tip 115 positioned in close proximity to the storage medium (Fig. 1);

(e) as in claim 9, molecules positioned between the energy-emitting tip 115 and the storage medium S wherein the molecules are at least partially immersed in a fluid medium (Fig. 1; column 2, lines 42 and 43; the fluid layer is particles/molecules in a liquid form);

(f) as in claim 10, the energy-emitting tip emits electrons (Fig. 1; AFM where its tip emits electrons to oxidize the medium's surface);

(g) as in claim 12, each of the molecules comprises a one-dimensional conductor molecule (the molecules are arranged in a line); and

(h) as in claim 14, the molecules comprise conductive molecules (Fig. 2; column 3, lines 8-12; water is conductive).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

6. Claims 1, 2, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manalis et al. (U.S. Patent 6,519,221) in view of Hillner et al. (U.S. Patent 5,479,024).

Manalis teaches a data storage device very similar to that of the instant invention. For example, Manalis teaches the following :

(a) as in claim 1, a data-storage device (Fig. 1);

(b) as in claim 1, a storage medium S (Fig. 1);

(c) as in claim 1, nanometer-scaled data storage areas in the storage medium (Fig. 1; column 1, lines 66 and 67; column 3, lines 38 and 39);

(d) as in claim 1, an energy-emitting tip 115 positioned in close proximity to the storage medium (Fig. 1);

(e) as in claim 1, a fluid medium positioned between the energy-emitting tip 115 and the storage medium S (Fig. 1; column 2, lines 42 and 43);

(f) as in claim 1, particles contained in the fluid medium (Fig. 1; fluid is particles/molecules in a liquid form);

(g) as in claim 2, the energy-emitting tip emits electrons (Fig. 1; AFM where its tip emits electrons to oxidize the medium's surface); and

(h) as in claim 8, the particles form a bridge between the tip and the storage medium (Fig. 1; fluid is an interface between the tip and the medium).

However, Manalis does not teach the following:

(a) as in claim 1, the fluid medium comprises a ferrofluid; and

(b) as in claim 7, the particles in the fluid medium comprise a magnetic material.

Hillner teaches a nanometer-scale/near-field data storage having a ferrofluid as a conducting layer (Fig. 4; column 9, lines 18-20; ferrofluid is a magnetic material).

A data/image system using a scanning probe in a nanometer scale requires its data/image be enhanced during the scanning operation. For example, Hillner uses a ferrofluid conductive layer to suppress noisy background in order to increase the brightness of his scanned object. Similarly, although Manalis

does not specify what is the fluid layer between the tip 115 and the substrate S, for the benefit of reducing a high voltage applied to the emitting tip and the substrate, it would have been obvious to one of ordinary skill in the art to use a conductive layer such as a ferrofluid layer similar to Hillner's as Manalis's thin fluid layer, because the conductive ferrofluid immerses the scanned surface so that a low voltage electrical path instead of noisy high voltage can be applied to Manalis's energy emitting-tip for improving the scanning sensitivity.

7. Claims 15, 16, 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manalis et al. (U.S. Patent 6,519,221) in view of Hillner et al. (U.S. Patent 5,479,024).

Manalis teaches a data storage method very similar to that of the instant invention. For example, Manalis teaches the following steps:

(a) as in claim 15, providing a storage medium comprising nanometer-scale data storage area (Fig. 1;

(b) as in claim 15, positioning an energy-emitting tip 115 in close proximity to the storage medium (Figs. 1 and 2;

(c) as in claim 15, guiding energy emitted from the energy-emitting tip to the storage area (Fig. 1);

(d) as in claim 15, the guiding step comprises channeling the energy-emitted through particle in a fluid medium between the

storage medium and the energy-emitting tip (Fig. 1; column 2, lines 42 and 43);

(e) as in claim 15, altering a state of the storage areas with the emitted, guided step (Fig. 1; energy emitted from the tip 115 induces oxidation on the surface of the storage medium); and

(f) as in claim 16, the guiding step comprises channeling the energy emitted through molecules positioned between the storage medium and the energy-emitting tip (Fig. 1; column 2, lines 42 and 43; energy emitted from the tip 115 induces oxidation through the fluid layer coated on the surface of the storage medium);

(g) as in claim 17, the fluid medium is conductive (Fig. 2; column 3, lines 8-12; water is conductive);

(h) as in claim 17, the molecules in the fluid medium comprises one-dimensional molecules (the fluid layer having molecules formed in one-dimension); and

(i) as in claim 19, the guiding step comprises using particles that form a bridge between the storage medium and the energy-emitting tip (Fig. 1; fluid is an interface between the tip and the medium).

However, Manalis does not teach the following steps;

(a) as in claim 15, the fluid medium is a ferrofluid.

Hillner teaches a nanometer-scale/near-field data storage

having a ferrofluid as a conducting layer (Fig. 4; column 9, lines 18-20).

A data/image system using a scanning probe in a nanometer scale requires its data/image be enhanced during the scanning operation. For example, Hillner uses a ferrofluid conductive layer to suppress noisy background in order to increase the brightness of his scanned object. Similarly, although Manalis does not specify what is the fluid layer between the tip 115 and the substrate S, for the benefit of reducing a high voltage applied to the emitting tip and the substrate, it would have been obvious to one of ordinary skill in the art to use a conductive layer such as a ferrofluid layer similar to Hillner's as Manalis's thin fluid layer, because the conductive ferrofluid immerses the scanned surface so that a low voltage electrical path instead of noisy high voltage can be applied to Manalis's energy emitting-tip for improving the scanning sensitivity.

8. Claims 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manalis et al. (U.S. Patent 6,519,221) in view of Hillner et al. (U.S. Patent 5,479,024) and During et al. (U.S. Patent 6,084,849).

Manalis in view of Hillner teach a data storage device very similar to that of the instant invention. However, both Manalis and Hillner do not teach the following:

(a) as in claims 3 and 11, the energy-emitting tip emits thermal energy.

Durig teaches a storage medium where an emitting tip emits heat energy (Figs 3A-3C; column 2, lines 25-42).

To cause a bump as a data bit on a storage medium by using an AFM, either an electrons emitting probe such as Manalis's or a heat emitting probe such as Durig's can be used. Hence, for providing energy to the tip of the AFM, it would have been obvious to one of ordinary skill in the art at the time of invention to choose either electron energy or heat energy, because both electron and heat are commonly used to make an indent on the surface of the storage medium.

9. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manalis et al. (U.S. Patent 6,519,221) in view of Hillner et al. (U.S. Patent 5,479,024) and Cleveland et al. (U.S. Patent 5,925,818).

Manalis in view of Hillner teach a data storage device very similar to that of the instant invention. However, both Manalis and Hillner do not teach the following:

(a) as in claims 5 and 6, the fluid comprised a high dielectric fluid/material.

Cleveland teaches an AFM where:

(a) a layer of dielectric fluid is used (column 14, lines 3-14; dielectric material contain conductive molecules because it is not an absolute insulating material); and

(b) dielectric fluid affects the capacitance of the detecting field (column 14, lines 5-14).

To improve the AFM's performance such as decrease the detection error, a non-conducing spacer may be located between Manalis's energy emitting tip and the storage medium. Hence, it would have been obvious to one of ordinary skill in the art to use a high dielectric fluid such as Cleveland's, because the high dielectric fluid can prevent ionized air which causes phenomena such as the variation of the relative capacitance between the tip and the storage medium.

10. Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Manalis et al. (U.S. Patent 6,519,221) in view Hillner et al. (U.S. Patent 5,479,024) and of Cleveland et al. (U.S. Patent 5,925,818) and further in view of Schaffer et al. (U.S. Patent 6,391,217).

Manalis in view of Hillner and Cleveland teach a data storage device very similar to that of the instant invention. However, Manalis in view of Hillner and Cleveland do not teach the following:

(a) as in claim 13, the conductor molecule comprises polymers.

Schaffer teaches an AFM having a liquified dielectric layer 110 made of dielectric polymer (Fig. 4b; column 4, lines 37-48).

For a dielectric material to change its physical state and act as a fluid so it would not damage the tip of Manalis's AFM, it would have been obvious to one of ordinary skill in the art to use Schaffer's dielectric polymer as Manalis's fluid layer, because the dielectric polymer can be liquified under an applied electric field.

11. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C. 20231 Or faxed to:

(703) 872-9306 (for formal communications intended for entry. Or:

(703) 746-6909, (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kim CHU whose telephone number is (703) 305-3032 between 9:30 am to 6:00 pm, Monday to Friday.

KC 1/21/04

Kim-Kwok CHU
Examiner AU2653
January 21, 2004

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